ORIGINAL
(Red)

R-585-5-3-9

A FINAL REPORT OF
R.H. BOGLE CHEMICAL COMPANY
PREPARED UNDER

TDD NO. F3-8303-38
EPA NO.
CONTRACT NO. 68-01-6699

FOR THE

HAZARDOUS SITE CONTROL DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

JULY 14, 1983

NUS CORPORATION
SUPRFUND DIVISION

SUBMITTED BY

(b) (6) [redacted]

APPROVED BY

(b) (6) [redacted]

MANAGER, FIT III

Site Name R. H. Bogle
TDD No. F3-8303-38
ORIGINAL
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SECTION 1

1.0 INTRODUCTION

1.1 Authorization

NUS Corporation performed this work under Environmental Protection Agency Contract 68-01-6699. This specific report was prepared in accordance with Technical Directive Document No. F3-8303-38 for the site R. H. Bogle Chemical Company located in Alexandria, Virginia.

1.2 Scope of Work

This report presents the results of a background study and a medium priority Preliminary Assessment done on R. H. Bogle Chemical Company, Alexandria, Virginia. This report is based upon a review of EPA, city of Alexandria and State of Virginia files, as well as a field visit.

1.3 Summary

In 1974, the Virginia State Water Control Board discovered large concentrations of arsenic in the soil at the R. H. Bogle Chemical Company Alexandria, Virginia. The site had been used by the company to manufacture herbicides for forty years. The chemicals were brought in bulk to the site then mixed with water in large tanks and loaded into railroad sprayer cars. The herbicides were used along railroad right of ways. At the end of each day, the spray cars were brought to the site and washed out. The run-off from this activity spread throughout the site and eventually reached a storm sewer on the north side of the property. In 1973, a city of Alexandria representative noted a yellowish discoloration in the water near the storm sewer outlet. The problem was traced back to the Bogle site.

The soil samples taken by the Water Control Board showed arsenic concentrations from 25 parts per million (ppm) up to 29,000 ppm over a 5 acre area.

The immediate concern was to keep the contaminated soil from moving off-site. The city of Alexandria required the Bogle Company to develop a short and long term solution to the problem.

The short term solution consisted of erecting a chain link fence around the site to limit access and covering the entire site with a layer of tar and gravel.

Bogle hired Dames and Moore to do a groundwater study and to propose a long term solution. The Dames and Moore report concluded that up to 15 feet of soil was contaminated. It was also stated that due to length of time, most of the arsenic compounds had reacted with soil constituents and become insoluble. Due to the large amount of material it was considered infeasible to remove the contaminated soil. The proposed solution consisted of capping the site with 18 inches of clay plus a layer of tar and concrete.

This would be followed by development of townhouses on the site. Restrictions on the construction included:

- o No basements or swimming pools.
- o Strict dust control during construction.
- o Placement of polyethelene around buried utility lines.

On April 1, 1983, NUS representative Dave Walker preformed a preliminary assessment of the site. It was noted that most of the site had been developed into townhouses. The northwest corner of the site is being used as parking for city buses, however, plans have been made to develop this area.

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SECTION 2

2.0 THE SITE

2.1 Location

The site is located in downtown Alexandria, adjacent to the Potomac River. The main part of the site runs from Pendleton Street South to Oronoco Street and from Fairfax Street east to Union Street. See Appendix A - Map 1.

2.2 Site Layout

The main part of the site covers two city blocks. While the site was in operation, city streets bordered it only on the west and south sides. After the site was closed and development occurred, Pendleton and Union Street were continued through the area.

During operations, the site was an open lot with a number of railroad spurs running north-south through it. The main Bogle office building was in the east half of the site along with the tanks used to formulate the herbicides. See Appendix A -Map 2.

Oronoco Bay is adjacent to the site to the northeast. A storm sewer ran directly from the site into Oronoco Bay.

Today development of townhouses has completely obscurred the old site.

2.3 Ownership History

The site was originally owned by R. H. Bogle Chemical Company. On March 10, 1978, the property was sold to Development Resources Inc. Alexandria, Virginia.

2.4 Site Use History

The site was used by the R. H. Bogle Chemical Company to formulate herbicides. The herbicides were used to control brush along railroad right of ways. Up until 1969, arsenic compounds, primarily sodium arsenite and arsenic trioxide, were used in the preparation of herbicides. The arsenic compounds were received from various suppliers in dry form in railroad cars. They were then mixed with water and loaded into spray cars.

Over the years, spillage of arsenic during unloading and during preparation of the herbicides resulted in accumulation of arsenic in the soil at the plant site. The major source of contamination was the washing out of the tank cars at the end of each day. The tank cars were rinsed out and the waste dumped onto the ground.

2.5 Permit and Regulatory Action History

The R.H. Bogle site was not required to have any permits. In January 1973, a representative from the city of Alexandria noted a yellowish discoloration in the waters of Oronoco Bay. The problem was traced to a storm sewer outlet. The source appeared to be the R.H. Bogle property where a tank car was being cleaned out.

In January 1973, the city of Alexandria requested the State Water Control Board to investigate the situation because of potential river pollution. No conclusive evidence of surface water pollution could be found. In 1974, soil tests were conducted and the results indicated very high concentrations of arsenic in and around the Bogle property. The concentrations ranged from 25 ppm to 29,000 ppm (see Appendix B.)

Regulatory action concerning the problem was initiated in December 1975. The R.H. Bogle Company was required to: 1) keep unauthorized persons off the property by erecting a chain link fence, 2) develop a short and long term solution to control surface run-off from the site, and 3) remove or neutralize the contaminated soil so that it would no longer pose a hazard to public health and safety.

On December 3, 1976, the U.S. EPA entered into an agreement with R.H. Bogle concerning the proposed solution to the arsenic problem.

The terms of the agreement followed the recommendations of the Dames and Moore report and Guidelines were set for the development of the property and future changes in ownership of the site.

2.6 Remedial Action To Date

In 1975, the R.H. Bogle Company was issued an order to keep unauthorized persons off the property. This was accomplished by erecting a chain link fence around the site.

The company was also required to develop a short and long term solution to the run-off problem. The short term solution consisted of the placement of a tar and gravel layer across the entire site.

The R.H. Bogle Company contracted Dames and Moore to do a groundwater study of the area and to develop a plan to control the potential harmful effects of the contamination. The Dames and Moore study concluded that:

1. The majority of the arsenic contamination occurs within 15 feet of the surface.
2. Artesian pressure in a deeper aquifer will preclude downward movement of contaminants.
3. The only significant movement of arsenic from the site is due to erosion and run-off.
4. This problem could be alleviated by developing the property using strict guidelines for architectural design and disturbance of soil during construction.
5. Most of the arsenic remaining in the soil has probably become insoluble due to chemical reactions with soil constituents.

The Dames and Moore recommendations were accepted by both city and state authorities.

In February 1976, urine tests were conducted on all employees (past and present) of the R.H. Bogle Company and residents in the surrounding area. The tests showed no unusual amounts of arsenic in any of the people tested.

In 1978, the property was sold to Resource Development, Inc., who began constructing townhouses on the site in 1980. Construction restrictions placed on the site by a city of Alexandria ordinance included:

- Placement of a minimum of 18 inches of iron-rich clay throughout the site. (Arsenic reacts with iron to produce an insoluble compound.)
- No basements or swimming pools were allowed.
- Very strick dust control procedures were followed during the construction.
- All utility lines were to be wrapped in polyethlene and backfilled with iron-rich clay.

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SECTION 3

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3.0 ENVIRONMENTAL SETTING

3.1 Surface Waters

While the site was in operation, drainage occurred through small gulleys and storm drains. The storm drains were located in the northern part of the site and ran directly to Oronoco Bay. Some run-off may have flowed southeast toward Founders Park. During the operation, all run-off was in close contact with contaminated soil. After development, the entire site was paved over. Surface water now enters into the city's sewer system. The sewer system at the site was carefully designed and installed to isolate it from the contaminated soil.

3.2 Geology and Soils

Alexandria is located on the Atlantic Coastal Plain. The surface deposits at the site and in the surrounding area consists of up to 15 feet of assorted fill material. The fill includes soil, construction material, and fly ash. Underlying the fill is 20-30 feet of fine to medium sands interbedded with silt and clay. Below this is a 10-20 foot layer of coarse sand and fine gravel, overlying a 20 foot layer of stiff blue clay. This clay is continuous throughout the area and increases in thickness towards the Potomac.

3.3 Groundwaters

The water table is 4-5 feet below the surface of the site. A groundwater study was conducted by Dames an Moore in 1976. The study concluded that the shallow groundwater in the area existed in two zones: a 25 foot water table zone comprised of interbedded silty sand and clay and a 10-20 foot zone of gravel and coarse sand under artesian pressure.

Direction of the water flow is northeast toward Oronoco Bay and the Potomac River. Discharge occurs directly into the Potomac from both zones.

The near surface water in the area is not utilized as a water supply. Two wells north of the site produce from the deeper cretaceous aquifers, but these are considered completely isolated from the near surface aquifers.

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3.4 Climate and Meteorlogy

Alexandria has a humid, temperate climate. The average yearly rainfall is 38-40 inches, most of which falls in the spring and summer months. The yearly lake evaporation is approximately 36 inches. Significant snowfalls are rare and remain on the ground only a few days.

3.5 Land Use

During the Bogle operation, the area of concern consisted of a 5 acre lot. The Bogle office building and the tanks used to formulate pesticides were in the eastern half of the site. The remainder of the site consisted of railroad sidings, parking area, and open field.

In 1978, the property was sold to Development Resources, Inc. Pendleton and Union Streets were continued through the site to complete the city block. Most of the site and surrounding area was developed into two-story townhouses.

The northwest corner of the site is currently used as a parking area for city buses. Plans have been made to build townhouses in this area in the near future.

3.6 Population Distribution

Since 1978, the site and surrounding area has been developed into two-story townhouses. This area of Alexandria is mostly residential with approximately 40 families per acre.

3.7 Water Supply

The city of Alexandria receives its water from the Occoquan River in Fairfax County. The water is purchased from a private water company, which in turn purchases water from Fairfax County.

3.8 Critical Environments

There are no critical environments associated with this site.

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SECTION 4

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4.0 WASTE TYPES AND QUANTITIES

Arsenic and arsenic compounds, including sodium arsenite and arsenic trioxides, were the wastes of greatest concern during the investigation and clean-up. A list of other chemicals handled and inventoried at the Bogle site is in Appendix C.

The amount of herbicides used at the Bogle site is known to be very large. Herbicides were manufactured on-site for forty years. Arsenic trioxide was last used in 1968. The entire operation was closed in 1976.

SECTION 5

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5.0 FIELD TRIP REPORT

5.1 Summary

On March 22, 1983, Mr. Jim Alexander, from the city of Alexandria Office of Environmental Quality, was contacted about the R.H. Bogle site. He supplied background information on the site and indicated he had an extensive file on the site.

A field visit was set for April 1, 1983. Mr. Alexander accompanied NUS representative, Dave Walker, during the Preliminary Assessment. The site has been completely obscurred by the development of townhouses. This development occurred after the site was investigated by the state of Virginia and the city of Alexandria.

Pictures were taken to document the current landuse. No apparent evidence of environmental contamination was found.

5.2 Persons Contacted

5.2.1 Prior To Field Trip

Jim Alexander
City of Alexandria
Office of Environmental Quality
Alexandria, VA
703-838-4966

Tom Schwaburg
Northern Region
State Water Control Board
Alexandria, VA
703-750-9111

Ernie Watkins
Northern Region
State Water Control Board
Alexandria, VA
703-750-9111

Robert Foreman
Northern Region
State Health Department
Calpepper, VA
703-825-6772

5.2.2 At The Site

Jim Alexander
City of Alexandria
Office of Environmental Quality
Alexandria, VA
703-838-4966

5.3 Site Observations

- NUS representative, Dave Walker, met with Jim Alexander at 9:00 AM on April 1, 1983.
- Mr. Alexander described the background history of the site.
- Dave Walker conducted the Preliminary Assessment at 9:20 AM of the R.H. Bogle site accompanied by Mr. Alexander.
- The weather was sunny, 70°F, with wind 5 to 10 mph from the south.
- The entire site area was traversed. Pictures were taken to document the current landuse.
- It was noted that the northwest part of the site has not yet been developed. Mr. Alexander said that plans for development are set for the near future.

Continued From Page 2

V. WASTE RELATED INFORMATION *(continued)*

3. LIST SUBSTANCES OF GREATEST CONCERN WHICH MAY BE ON THE SITE *(place in descending order of hazard)*. ORIGINAL (Red)

Arsenic

4. ADDITIONAL COMMENTS OR NARRATIVE DESCRIPTION OF SITUATION KNOWN OR REPORTED TO EXIST AT THE SITE.

VI. HAZARD DESCRIPTION

A. TYPE OF HAZARD	B. POTENTIAL HAZARD *(mark 'X')*	C. ALLEGED INCIDENT *(mark 'X')*	D. DATE OF INCIDENT *(mo., day, yr.)*	E. REMARKS
1. NO HAZARD	X			
2. HUMAN HEALTH				Remedial action concerning site is complete.
3. NON-WORKER INJURY/EXPOSURE				
4. WORKER INJURY				
5. CONTAMINATION OF WATER SUPPLY				
6. CONTAMINATION OF FOOD CHAIN				
7. CONTAMINATION OF GROUND WATER				
8. CONTAMINATION OF SURFACE WATER				
9. DAMAGE TO FLORA/FAUNA				
10. FISH KILL				
11. CONTAMINATION OF AIR				
12. NOTICEABLE ODORS				
13. CONTAMINATION OF SOIL				
14. PROPERTY DAMAGE				
15. FIRE OR EXPLOSION				
16. SPILLS/LEAKING CONTAINERS/ RUNOFF/STANDING LIQUIDS				
17. SEWER, STORM DRAIN PROBLEMS				
18. EROSION PROBLEMS				
19. INADEQUATE SECURITY				
20. INCOMPATIBLE WASTES				
21. MIDNIGHT DUMPING				
22. OTHER *(specify)*:				

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VII. PERMIT INFORMATION

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NDICATE ALL APPLICABLE PERMITS HELD BY THE SITE.

] 1. NPDES PERMIT ☐ 2. SPCC PLAN ☐ 3. STATE PERMIT *(specify)*: _____

] 4. AIR PERMITS ☐ 5. LOCAL PERMIT ☐ 6. RCRA TRANSPORTER

] 7. RCRA STORER ☐ 8. RCRA TREATER ☐ 9. RCRA DISPOSER

] 10. OTHER *(specify)*: No permits

N COMPLIANCE?

] 1. YES ☐ 2. NO ☐ 3. UNKNOWN

4. WITH RESPECT TO *(list regulation name & number)*: N/A

VIII. PAST REGULATORY ACTIONS

] A. NONE ☒ B. YES *(summarize below)*

H. Bogle Co. was required to put a fence around the property, cover site with a layer tar and gravel to minimize runoff. Remove or neutralize contaminated soil so it uld no longer pose a public health problem.

IX. INSPECTION ACTIVITY *(past or on-going)*

] A. NONE ☐ B. YES *(complete items 1,2,3, & 4 below)*

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION *(mo., day, & yr.)*	3. PERFORMED BY: *(EPA/State)*	4. DESCRIPTION
ater and Soil Tests	1973-1974	State WCB	Tests were conducted to determine the amount and extent of contamination.

X. REMEDIAL ACTIVITY *(past or on-going)*

] A. NONE ☒ B. YES *(complete items 1, 2, 3, & 4 below)*

1. TYPE OF ACTIVITY	2. DATE OF PAST ACTION *(mo., day, & yr.)*	3. PERFORMED BY: *(EPA/State)*	4. DESCRIPTION
ence erected around ite and layer of tar.	Dec. 1975	R.H. Bogle	and gravel was installed to minimize runoff.
.ong term solution.	1980	Resource Development	Townhouses were built on the site under strict guidelines for construction. Including a cap of 18 inches of clay.

OTE: Based on the information in Sections III through X, fill out the Preliminary Assessment *(Section II)* information on the first page of this form.

TDD No. F3-8303-38

POTENTIAL HAZARDOUS WASTE SITE
IDENTIFICATION AND PRELIMINARY ASSESSMENT

EPA

REGION: III

SITE NUMBER (to be assigned by Hq):

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NOTE: This form is completed for each potential hazardous waste site to help set priorities for site inspection. The information submitted on this form is based on available records and may be updated on subsequent forms as a result of additional inquiries and on-site inspections.

GENERAL INSTRUCTIONS: Complete Sections I and III through X as completely as possible before Section II *(Preliminary Assessment)*. File this form in the Regional Hazardous Waste Log File and submit a copy to: U.S. Environmental Protection Agency; Site Tracking System; Hazardous Waste Enforcement Task Force *(EN-335)*; 401 M St., SW; Washington, DC 20460.

I. SITE IDENTIFICATION

A. SITE NAME: R.H. Bogle Chemical Co.

B. STREET *(or other identifier)*: Foot of Oronoco Street

C. CITY: Alexandria

D. STATE: VA

E. ZIP CODE: 22313

F. COUNTY NAME: Alexandria

G. OWNER/OPERATOR *(if known)*

1. NAME: R.H. Bogle Chemical Co.

2. TELEPHONE NUMBER:

H. TYPE OF OWNERSHIP

☐ 1. FEDERAL ☐ 2. STATE ☐ 3. COUNTY ☐ 4. MUNICIPAL ☒ 5. PRIVATE ☐ 6. UNKNOWN

I. SITE DESCRIPTION

Site was a 5 acre lot between Fairfax Street and between Pendleton and Oronoco Street in Alexandria. The site has been developed and townhouses obscure the site.

J. HOW IDENTIFIED *(i.e., citizen's complaints, OSHA citations, etc.)*: City of Alexandria Representative

K. DATE IDENTIFIED *(mo., day, & yr.)*: 1973

L. PRINCIPAL STATE CONTACT

1. NAME: Ernie Watkins, Northern Region State Water Control Board

2. TELEPHONE NUMBER: (703) 750-9111

II. PRELIMINARY ASSESSMENT *(complete this section last)*

A. APPARENT SERIOUSNESS OF PROBLEM

☐ 1. HIGH ☐ 2. MEDIUM ☐ 3. LOW ☒ 4. NONE ☐ 5. UNKNOWN

B. RECOMMENDATION

☒ 1. NO ACTION NEEDED *(no hazard)*

☐ 2. IMMEDIATE SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR: _____
b. WILL BE PERFORMED BY: _____

☐ 3. SITE INSPECTION NEEDED
a. TENTATIVELY SCHEDULED FOR: _____
b. WILL BE PERFORMED BY: _____

☐ 4. SITE INSPECTION NEEDED *(low priority)*

C. PREPARER INFORMATION

1. NAME: David Walker

2. TELEPHONE NUMBER: 215-687-9510

3. DATE *(mo., day, & yr.)*: 5/23/83

III. SITE INFORMATION

A. SITE STATUS

☐ 1. ACTIVE *(Those industrial or municipal sites which are being used for waste treatment, storage, or disposal on a continuing basis, even if infrequently.)*

☒ 2. INACTIVE *(Those sites which no longer receive wastes.)*

☐ 3. OTHER *(specify)*: _____ *(Those sites that include such incidents like "midnight dumping" where no regular or continuing use of the site for waste disposal has occurred.)*

B. IS GENERATOR ON SITE?

☐ 1. NO ☒ 2. YES *(specify generator's four-digit SIC Code)*: Generator was on site.

C. AREA OF SITE *(in acres)*: 5 acres

D. IF APPARENT SERIOUSNESS OF SITE IS HIGH, SPECIFY COORDINATES

1. LATITUDE *(deg.-min.-sec.)*: 47° 40' N

2. LONGITUDE *(deg.-min.-sec.)*: 77° 02' 30" W

E. ARE THERE BUILDINGS ON THE SITE?

☐ 1. NO ☒ 2. YES *(specify)*: During the operation the Bogle office and some storage buildings. Now townhouses on entire site.

Continue On Reverse

ued From Front

IV. CHARACTERIZATION OF SITE ACTIVITY

e the major site activity(ies) and details relating to each activity by marking 'X' in the appropriate boxes.

A. TRANSPORTER	'X'	B. STORER	'X'	C. TREATER	'X'	D. DISPOSER
AIL		1. PILE		1. FILTRATION		1. LANDFILL
HIP		2. SURFACE IMPOUNDMENT		2. INCINERATION		2. LANDFARM
ARGE		3. DRUMS		3. VOLUME REDUCTION		3. OPEN DUMP
RUCK	X	4. TANK, ABOVE GROUND		4. RECYCLING/RECOVERY		4. SURFACE IMPOUNDMENT
IPELINE		5. TANK, BELOW GROUND		5. CHEM./PHYS. TREATMENT		5. MIDNIGHT DUMPING
THER (specify):	X	6. OTHER (specify):		6. BIOLOGICAL TREATMENT		6. INCINERATION
				7. WASTE OIL REPROCESSING		7. UNDERGROUND INJECTION
		Spillage and leakage		8. SOLVENT RECOVERY		8. OTHER (specify):
				9. OTHER (specify):		

ECIFY DETAILS OF SITE ACTIVITIES AS NEEDED Site was used to manufacture herbicides for 40 ars. Chemicals were mixed in tanks on site, then loaded into railroad spray cars r use on right of ways. The empty cars were brought back to the site and washed out. e waste water was dumped on the ground.

V. WASTE RELATED INFORMATION

STE TYPE

UNKNOWN [X] 2. LIQUID [ ] 3. SOLID [ ] 4. SLUDGE [ ] 5. GAS

STE CHARACTERISTICS

UNKNOWN [ ] 2. CORROSIVE [ ] 3. IGNITABLE [ ] 4. RADIOACTIVE [ ] 5. HIGHLY VOLATILE

TOXIC [ ] 7. REACTIVE [ ] 8. INERT [ ] 9. FLAMMABLE

). OTHER (specify): _____

STE CATEGORIES

re records of wastes available? Specify items such as manifests, inventories, etc. below.

ne available.

stimate the amount (specify unit of measure) of waste by category; mark 'X' to indicate which wastes are present.

. SLUDGE	b. OIL	c. SOLVENTS	d. CHEMICALS	e. SOLIDS	f. OTHER
NT	AMOUNT	AMOUNT	AMOUNT	AMOUNT	AMOUNT
OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE	UNIT OF MEASURE
PAINT, PIGMENTS	'X' (1) OILY WASTES	'X' (1) HALOGENATED SOLVENTS	'X' (1) ACIDS	'X' (1) FLYASH	'X' (1) LABORATORY PHARMACEUT.
METALS SLUDGES	(2) OTHER (specify):	(2) NON-HALOGNTD. SOLVENTS	(2) PICKLING LIQUORS	(2) ASBESTOS	(2) HOSPITAL
POTW		(3) OTHER (specify):	(3) CAUSTICS	(3) MILLING/ MINE TAILINGS	(3) RADIOACTIVE
ALUMINUM SLUDGE			(4) PESTICIDES	(4) FERROUS SMLTG. WASTES	(4) MUNICIPAL
OTHER (specify):	Chemicals were for 40 years. unknown up to over a 5 acre nated.	used on site Exact amounts 5 feet of soil area is contami-	(5) DYES/INKS	(5) NON-FERROUS SMLTG. WASTES	(5) OTHER (specify):
			(6) CYANIDE	(6) OTHER (specify):	
			(7) PHENOLS		
			(8) HALOGENS		
			(9) PCB		
			(10) METALS		
			X (11) OTHER (specify) Herbicides		

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5.5 EPA Assessment Form

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APPENDIX A

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SITE NAME R.H. Bogle Chemical Company
TDD NO. F3-8303-38
EPA NO.
TITLE: Site Location

SOURCE: U.S.G.S. Quadrangle Alexandria VA 1965

SCALE: Not to Scale

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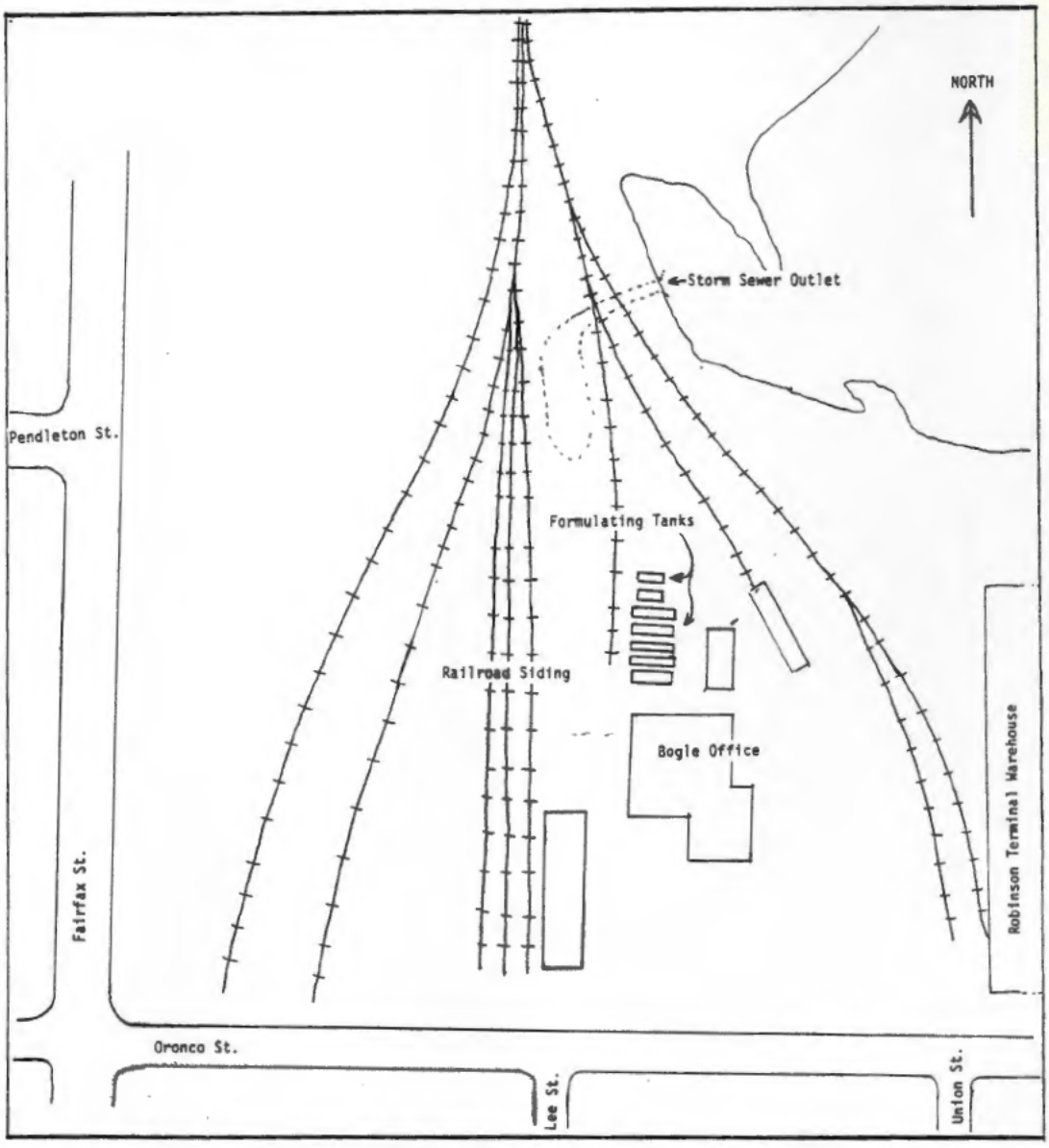
SITE NAME R.H. Bogle Chemical Company
TDD NO. F3-8303-38
EPA NO.
TITLE: Site Sketch - During Bogle Operation



SOURCE: Dames and Moore Report 1976

SCALE: Not to Scale

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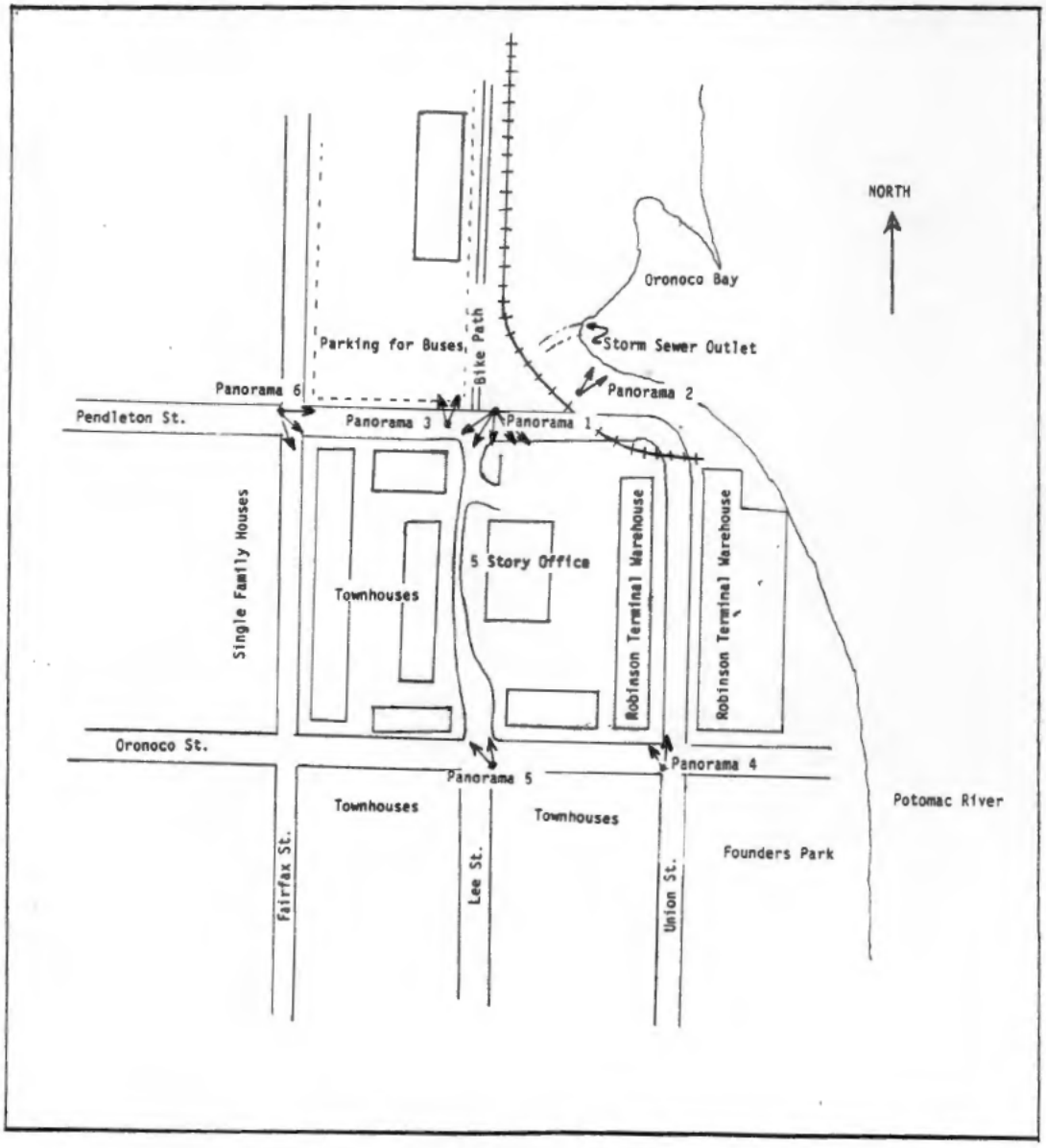
SITE NAME R.H. Bogle Chemical Company
TDD NO. F3-8303-38
EPA NO.
TITLE: Site Sketch - Site Visit April 1983



SOURCE: Site Visit April 1, 1983

SCALE: Not to Scale

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APPENDIX B

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R.H. Bogle Company

Date	Sampling Location	Concentration	
4/5/74	Sediment Sample - Bogle Storm Grate	2,4,D	390 ppm
		Silvex	800 ppm
		Atrazine	1.0 ppm
		Endrin	4.0 ppm
		Sutan	1.0 ppm
		Bromacil	2.0 ppm
4/9/74	Storm drain runoff behind maintenance bldg. Ornoco and N. Lee Street, Bogle Co.	Silvex	64 ppm
		Atrazine	8 ppm
		PCB	10.6ppm
		Alpha-BHC	6.4 ppm
		Dieldrin	74 ppm
		Endrin	80 ppm
		2,4,D	76 ppm
4/9/74	Potomac River - South end of cove adjacent to R.H. Bogle Co.	Dieldrin	.16 ppm
		Endrin	0.11ppm
4/9/74	North end of cove on Potomac River adjacent to Bogle	Dieldrin	.06 ppm
		Endrin	.06 ppm
11/20/74	R.H. Bogle from lot drainage basin prior to entrance into catch basin, sediment sample.	PCB	810 ppm
		Lindane	55 ppm
		Dieldrin	140 ppm
11/20/74	R.H. Bogle - From lot drainage basin.	Arsenic	2 ppm
		Chloro IPC	15000 ppb
		Antrazine	41000 ppb
1/9/75	Outfall from R.H. Bogle Co.	Atrazine	5.4 ppb
1/9/75	Gully above lower drain R.H. Bogle Co. Sediment sample.	Chlorodane	24.6 ppm
		Unk. Cl compound	0.2 ppm
1/31/75	Storm drain on Co. Property	Pentachloro Phenol	140 ppb
1/31/75	Sediment sample collected from various points on Co. property	Chlor IPC	135 ppm
		Unk. Cl compound	540 ppm
1/31/75	Sediment sample collected from basin	PCB	1.0 ppm
		Unk. Cl compound	0.17ppm
3/18/75	Lot of R.H. Bogle Co.	Arsenic	440 ppm
		Cadmium	.070ppm
		Chromium	1.13 ppm
		Lead	3.700ppm
		Mercury	0.0011ppm
		Zinc	4.4 ppm
		Nickel	0.62 ppm

* Note Copied from
State Water Control Board Files
4/1/83

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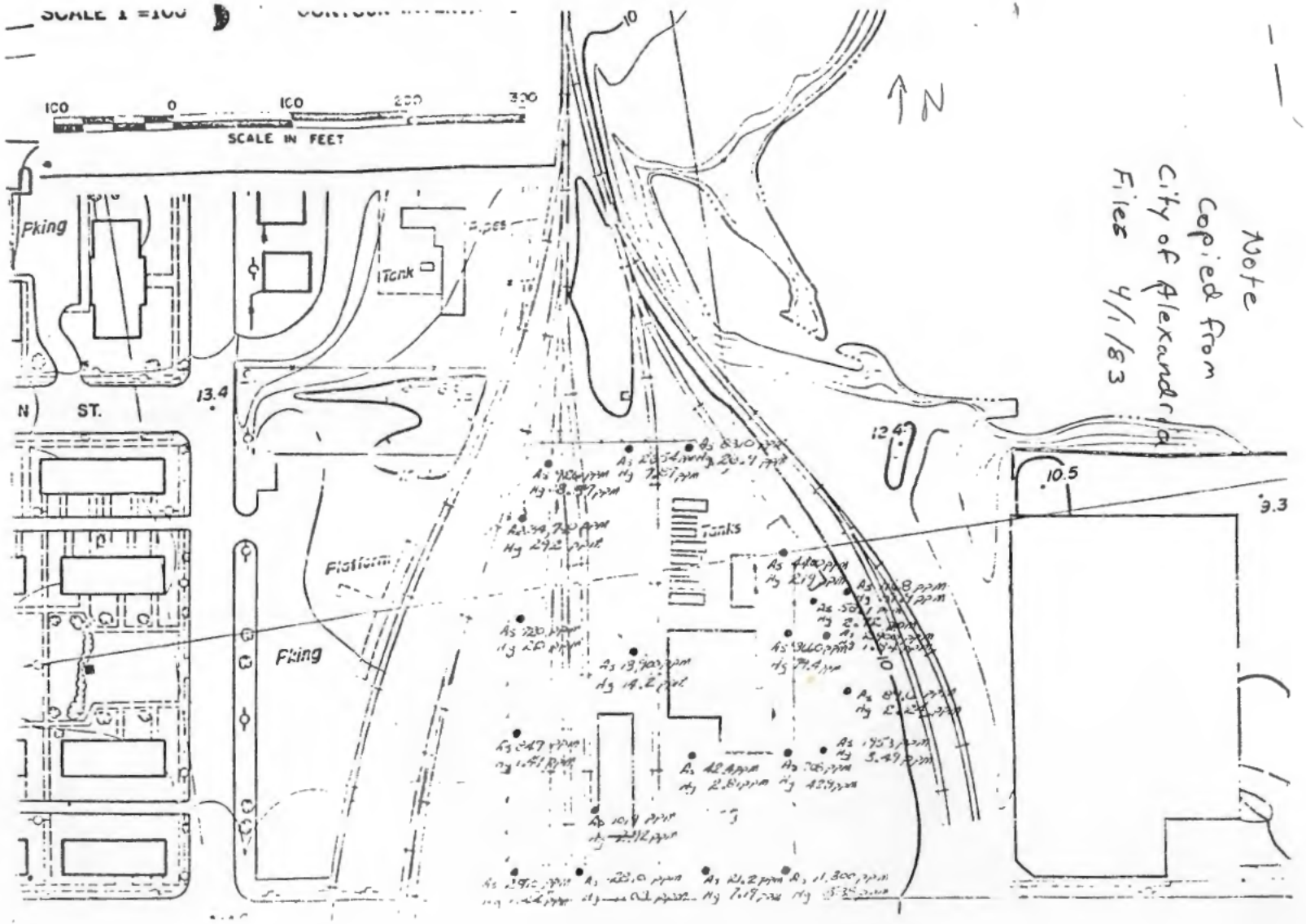
3/18/75	Lot of R.H. Bogle Co.	Antrazine	3300 ppb
		DDT	68 ppb
		Unk. Cl compound	180 ppb
		2,4,d	440 ppb
		24,-5-T	20 ppb
		Dicamba	6 ppb
3/25/75	Sampled immediately at catch basin. Sediment sample	Arsenic	4600 ppm
		%Volatile	5%
		Atrazine	80 ppm
		CIP C	5.0 ppm
		Methoxychlor	62 ppm
3/25/75	Sampled on the property (operations area) of R.H. Bogle Co. Sediment Sample	Arsenic	10,640 ppm
		%Volatile	6%
		Atrazine	115 ppm
		CIPC	6.5 ppm
		Methoxychlor	292 ppm
5/1/75	Bogle, Alexandria	Cadmium	0.02 ppm
		Chromium	0.2 ppm
		Copper	0.54 ppm
		Lead	.272 ppm
		Zinc	1.0 ppm
		Nickel	0.1-ppm
5/1/75	Bogle, Alexandria	Atrazine	1623 ppb
		Dieldrin	25 ppb
		DDT	81 ppb

* Note: copied from State Water Control Board Files 4/1/83



Note
Copied from
City of Alexandria
Files 4/1/83

ORIGINAL
(Red)

APPENDIX C

ORIGINAL
(Red)

* Note copied from City of Alexandria Files 4/1/83

CHEMICALS HANDLED & INVENTORIED AT ALEXANDRIA:

- Arsenic trioxide (last handled 1967) –
- Sodium hydroxide
- Sodium chlorate – never in plant
- Calcium Chloride – used for dust – to concrete
- 2,4-D – now
- 2,4,5-T – now
- Sodium trichloroacetate – not used
- Monuron – (Telvar) – soil sterilant – now, little
- Simazine – (Geigy) now – [illegible]
- Dowpon – now
- Diuron – now
- Atrazine – now
- Bromacil – now
- MSMA – [illegible] arsenite – mixed with 2,4-D; 2,4,5-T – drums –
- TBA –
- ☆ Aminotriazole –
- Paraquat –
- NE-1 –
- NE-2
- Pentachlorophenol – not used
- Tordon 101 – brush killer –
- Paradichlorobenzene – not used

Tandex – [illegible] used

These cpds do not contain any mercury or derivative of same.

☆ – a carcinogen

Most of these cpds are herbicides, usually polychlorinated forms.

(HWB) 3-8-76

ORIGINAL
(Red)